

CLAIMS

1. A method for manufacturing electrically conductive macromolecules by reacting at least a monomer and an oxidizing agent to obtain electrically conductive macromolecules by a chemical polymerization method, the method comprising:
reacting the monomer and the oxidizing agent in a polymerizing vessel that contains at least a supersaturated steam atmosphere.
2. The method for manufacturing electrically conductive macromolecules according to claim 1,
wherein the steam concentration of the supersaturated steam atmosphere is at least 5 vol%.
3. The method for manufacturing electrically conductive macromolecules according to claim 1,
wherein the temperature of the supersaturated steam atmosphere is at least 85°C.
4. The method for manufacturing electrically conductive macromolecules according to claim 1,
wherein preliminary polymerization is performed in advance at a temperature of less than 85°C, before reacting the monomer and the oxidizing agent in the supersaturated steam atmosphere in the polymerizing vessel.
5. The method for manufacturing electrically conductive macromolecules according to claim 1,
wherein the concentration of oxygen in the supersaturated steam atmosphere is less than 21 vol%.
6. The method for manufacturing electrically conductive macromolecules according to claim 1,
wherein the monomer is at least one selected from pyrrole, thiophene, 3,4-ethylenedioxythiophene, aniline and derivatives of these.
7. The method for manufacturing electrically conductive

macromolecules according to claim 1,

wherein the oxidizing agent is at least one selected from manganese oxide, iron (III) salts, copper (II) salts, hydrogen peroxide and persulfate salts.

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8. The method for manufacturing electrically conductive macromolecules according to claim 1,

wherein the monomer and the oxidizing agent are at least dissolved in a water soluble solvent or water.

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9. The method for manufacturing electrically conductive macromolecules according to claim 1,

wherein when observing a layer of the electrically conductive macromolecules from the side, a ratio d/L of a separation distance d of the electrically conductive macromolecular layer from a substrate, to a length L , is 0.02 or less.

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10. An apparatus for manufacturing electrically conductive macromolecules, for polymerizing at least a monomer and an oxidizing agent in a polymerizing vessel,

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wherein the polymerizing vessel that contains a supersaturated steam atmosphere includes a device for providing dry air and steam that is generated by a heat exchanger to the polymerizing vessel, and

wherein the reaction of the monomer and the oxidizing agent at least occurs within the polymerizing vessel in the supersaturated steam atmosphere.

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11. The apparatus for manufacturing electrically conductive macromolecules according to claim 10,

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wherein the temperature of the steam generated by the heat exchanger is higher than the temperature of the dry air.